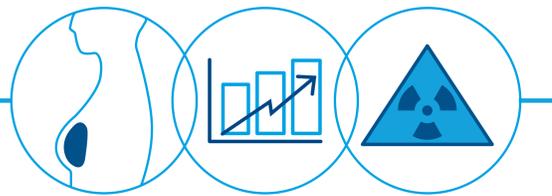


# Radiation dose reduction with digital mammography for breast screening



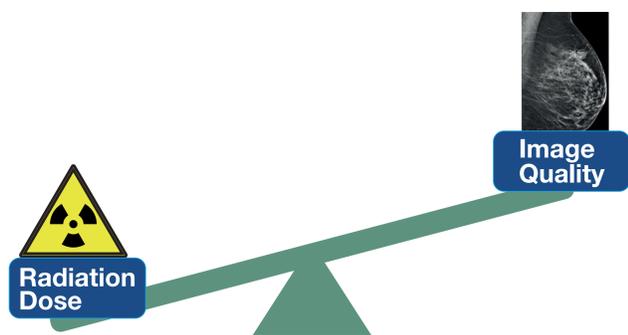
## Background

From 2013 to 2015, the Scottish Breast Screening Programme (SBSP) transitioned from analogue to digital X-ray imaging technology for the production of mammograms. An investigation into the impact of this change on the radiation dose to the screening population was undertaken. Legislation<sup>1</sup> requires that routine radiation dose audits and the optimisation of dose and image quality are undertaken. Results from the dose audits can be compared to UK and European reference levels as an indication of good practice<sup>2,3,4</sup>. Optimisation data has been collated nationally, and this study compares SBSP performance with this national dataset.



## Aim

By providing an effective breast screening programme, which aims to detect early signs of breast cancer, this will support the 2020 Vision to enable Scottish women to live longer, healthier lives. Ensuring the radiation dose is low, whilst producing adequate image quality, results in a safe system with the highest standards of quality and places the woman at the heart of the programme.



## Method

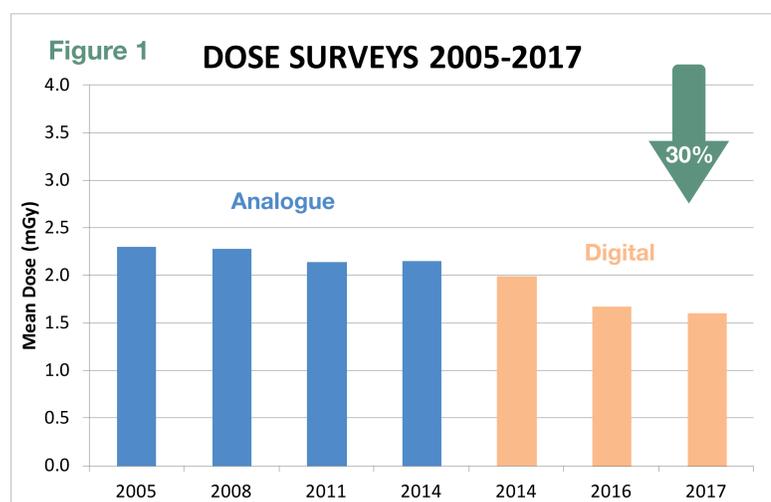
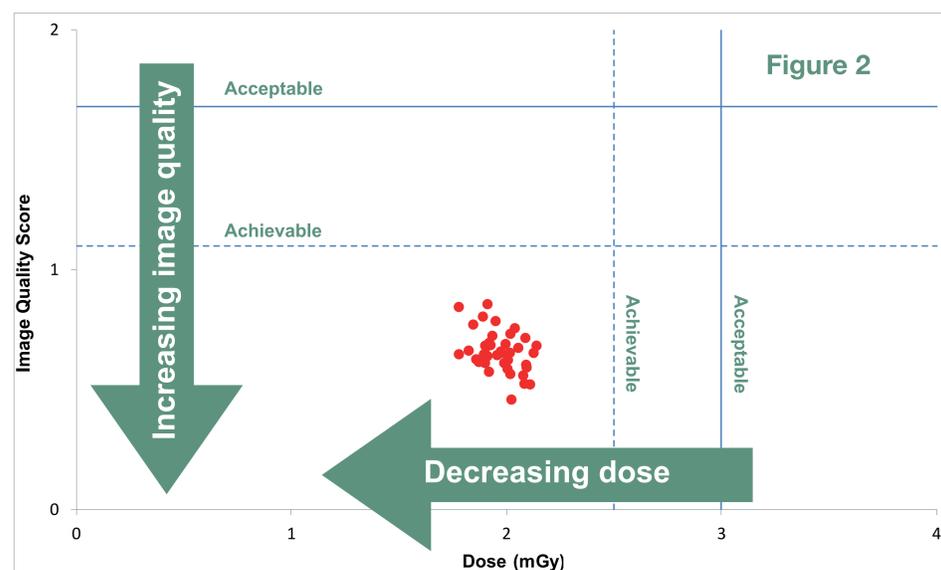
A review of all radiation dose audits carried out between 2005 and 2017 within the SBSP was undertaken. The dose audits were undertaken at a minimum interval of 3 years for the approximately 40 x-ray units in current use within the SBSP and involved standard views for at least 50 women per unit. Image quality tests are performed on every x-ray unit at six monthly physics surveys and compared against baseline values as well as national standards<sup>5</sup>.

## Optimisation

Legislation states that doses arising from the exposure are kept as low as reasonably practicable consistent with the intended purpose. Image quality tests are performed routinely to ensure adequate information contained within clinical image.

## Outcomes and Results

- Mean radiation dose for a standard oblique view to the breast has reduced by 30% with the introduction of digital imaging, producing a significant reduction in dose (Figure 1).
- Current average dose levels are at 1.6mGy, well below the UK reference level of 2.5mGy.
- Image quality measurements show that the mammography image meets all current national and European standards<sup>6</sup>.
- For all x-ray units within the SBSP, the image quality meets the minimum requirements of acceptable and achievable limiting values.
- Figure 2 shows the approach adopted nationally to demonstrate optimisation using results from the image quality tests in conjunction with dose to a 'standard' breast. If image quality was compromised by the reduction in radiation dose this would impact the cancer detection rates which is not indicated by the data<sup>7</sup>.



## References

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Authors

Anne McCurrach  
and Kath Schofield,  
Medical Physics,  
National Services  
Scotland